Thus, to measure manufacturing output, it is necessary to measure purchased inputs from the service-producing and other sectors. If service inputs are increasingly understated because of quality changes, this might explain some of the divergence in the productivity indexes for manufacturing versus service sectors.

If measurement problems are indeed the primary reason for the lack of productivity growth in the nonfarm, nonmanufacturing sector, this would imply a radically different perception of the productivity problem, since productivity growth in manufacturing and agriculture has shown no diminution (although measured productivity change in construction, a goods-producing industry, has been negative for many years). Such a view would probably give undue emphasis to the role of measurement, however. For one thing, manufacturing in recent years has had to face extremely keen international competition, which has no doubt caused management to trim labor and other costs more sharply than usual. The service-producing sector is not generally subject to such intense international competitive pressures. A second reason (related to the first) is the extraordinary growth of employment in the service-producing sector. The capital/labor ratio has been rising much more rapidly in manufacturing than in the nonfarm, nonmanufacturing sector. 28/

Serious measurement problems also exist for the construction industry, where each house or building or road tends to be unique. According to the Bureau of Labor Statistics (BLS) measure, output per hour in the construction industry has declined an average of about 3 percent annually since the mid-1960s, which implies that productivity is only about 55 percent of its former level. Studies of productivity in the construction industry have isolated some of the reasons: a shift in the composition of work toward more residential construction and less large-scale commercial construction; a shift in the composition of highway construction from rural to urban; and the completion of more of the work at the factory, permitting a lower grade of labor at the construction site. Yet, much of the slowdown remains

28. The rates of growth in the capital/labor ratio in the private nonfarm business economy (using data from the Bureau of Labor Statistics) have been as follows:

	Manufacturing	Nonmanufacturing
1948-1965	2.2	1.8
1965-1973	3.4	2.2
1973-1981	4.2	1.5
1981-1985	2.2	1.2

unexplained. 29/ Many experts seriously doubt that productivity has declined as much as the official data suggest, if at all. For one thing, they point to advances in building techniques and to improved building materials. For another, the BLS maintains a more detailed series on the hours required to construct particular standard projects, which shows modest but significant improvements in output per hour.

Many new products and quality changes (for both goods and services) are not fully reflected in the price index used to construct the output part of the productivity equation. As indicated in the construction example, some of the slowdown in productivity has been traced to inadequacies of price indexes. For instance, many medical services and capabilities did not exist 20 or even 10 years ago. New services or products are not at first included in the price indexes used to deflate nominal values of output. As they become more widely used, however, price data are collected and they are included in the price indexes. In general, the result is probably some understatement of gains in productivity, although the magnitude of the bias is unknown.

Problems of measurement are not limited to the nonmanufacturing sector. 30/ The quality of improvements associated with the introduction of more fuel-efficient cars and airplane engines have not been fully reflected in available productivity measures. One recent attempt to take improvement in quality into account led to a significant upward revision in the output index for the computer industry. Until recently, the Commerce Department had assumed that prices were unchanged for that industry. As part of the GNP revisions in late 1985, it introduced declining prices, and these translated into higher output per hour. 31/

While problems of measurement probably impart a downward bias to existing measures of productivity, some analysts argue that measurement does not explain the productivity slowdown. That would require that measurement problems grew worse beginning in the early 1970s, whereas

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29. See Kemble Stokes, "An Examination of the Productivity Decline in the Construction Industry," *Review of Economics and Statistics*, vol. 63 (November 1981), pp. 495-502; and Stephen G. Allen, "Why Construction Industry Productivity Is Declining," *Review of Economics and Statistics*, vol. 67, no. 4 (November 1985), pp. 661-669.

30. For example, see Frank L. Lichtenberg and Zvi Griliches, "Errors of Measurement in Output Deflators," National Bureau of Economic Research, Working Paper Series, No. 2000 (August 1985).

31. Since office equipment is a major category of business fixed investment, this revision also raised substantially the estimated growth of business capital in recent years.

output measures--at least as conventionally defined--have probably been substantially improved. 32/ On the other hand, structural changes may have exacerbated ever-present measurement problems. If measurement problems are more severe in services, the fact that services as a share of output have increased might cause the bias to get worse. In addition, inflation became worse in the 1970s, and imperfect price indexes could have led to larger measurement errors as a result. If so, this source of error should have diminished with lower inflation in the 1980s, but the sectors for which price measures are believed to be of especially poor quality, such as construction, have shown little if any recovery in productivity.

THE ROLE OF INVESTMENT IN THE GROWTH SLOWDOWN

Whatever the errors of measurement, most analysts are convinced that there has been an underlying slowdown in productivity growth. Attention has naturally turned to policies that might reverse the trend. The following discussion focuses on the role of capital investment, and on how governmental policies--especially fiscal policy--may affect investment. This focus does not mean that capital investment is necessarily the most important source of productivity change. Rather, it reflects the impact that federal taxing and spending policies may have on investment and ultimately on economic growth. These policies offer one of the few concrete ways in which the government can contribute to solving the growth problem.

The Importance of Capital Formation

Many studies have been conducted on the role of capital formation in the productivity slowdown. Some of them are listed in Table III-1. As the table makes clear, there is little agreement in their results. A few studies, notably those by Denison, conclude that inadequate physical capital formation has contributed negligibly to the productivity slowdown (that is, it may account for only 4 percent to 8 percent of the decline in productivity), while another study, that of Norsworthy, Harper, and Kunze, comes to the contrary conclusion: that it may have accounted for more than 70 percent of the decline. Other studies summarized in the table suggest that lagging physical investment may have caused roughly one-fifth to one-half of the productivity slowdown. Thus, while most studies agree that changes in investment have played a significant role in causing variations in productiv-

32. See Albert Rees, "Improving Productivity Measurement," *American Economic Review* (May 1980), pp. 340-342.

ity, they disagree on investment's quantitative importance. This disagreement reflects several complex aspects of physical investment:

- Technology. Capital investment may have an important indirect effect on productivity to the extent that technological advances that increase overall productivity must be "built into" the capital stock in order to be effective. There is a great deal of uncertainty over the importance of this issue.

- Obsolescence. Some analysts have argued that measurements of the capital stock--the only existing hard data on capital inputs--do not take account of variations in the degree of obsolescence of different parts of the capital stock during a given period--an issue that is very important to productivity studies. For example, Baily has pointed out that the usefulness of existing energy-intensive capital may have been severely reduced by the energy price increases of the 1970s in a manner not reflected in the measurements of capital stocks. In addition, Baily and several others have suggested that structural changes may have accelerated for a variety of reasons, such as greater competitive pressures from international trade, and that these have been accompanied by corresponding reductions in productive services from the existing capital stock. 33/

- Regulation. Increased pollution abatement and other regulations (particularly over the past 15 years) have forced corporations to undertake investments that did not increase measured output. Such regulations also cause more capital to become obsolete.

Policies to Stimulate Capital Investment

Broadly speaking, two types of policy--fiscal policy and tax policy--are thought to have a permanent effect on fixed capital formation.

- Aggregate fiscal policy may have an important effect on investment in human and physical capital and in research and develop-

33. See Martin N. Baily, "Productivity and the Services of Capital and Labor," *Brookings Papers on Economic Activity*, vol. 1 (1981), pp. 1-50. In addition, important surveys of related issues in the specific context of energy-capital relationships are presented in E.R. Berndt, "Reconciling Alternative Estimates of the Elasticity of Substitution," *Review of Economics and Statistics*, vol. 63, no. 1 (February 1976), pp. 59-68; and J.M. Griffin and D.R. Gregory, "An Intercountry Translog Model of Energy Substitution Responses," *American Economic Review*, vol. 66 (December 1976), pp. 845-857.

ment, insofar as it affects the federal budget deficit. The deficit absorbs savings, and only what is left over can be invested in productive capital. 34/

- Tax policy can raise or lower the overall cost of physical investment through changes in investment tax credits, depreciation allowances, and other provisions. Moreover, measures to equalize the tax treatment of different types of investments can contribute to productivity by improving the allocation of investment funds. This improvement was a major purpose of the Tax Reform Act of 1986.

The Role of Federal Deficits in Economic Growth and Capital Formation

Economists generally agree that smaller federal deficits tend to encourage private capital formation and have a favorable impact on the standard of living in the long run. They are far from unanimous, however, as to the short-run consequences of changes in fiscal policy.

According to the standard Keynesian model of the economy, deficit reductions tend to reduce aggregate spending and production--unless offset by monetary expansion or other factors. Over a very short horizon, deficit reductions may actually reduce investment to the extent that investment is sensitive to the rate of growth in output. This depressing effect on production should be offset over time by a positive effect on the trade deficit. The reason is that a reduction in the budget deficit puts downward pressure on U.S. interest rates and as a result reduces capital inflows. The reduction in net capital inflows lowers the value of the dollar and should eventually reduce the trade deficit. The net result is that the fiscal deficit declines and ownership of capital increases. 35/

Finally, the strict monetarist view, associated with the writings of Milton Friedman and others, maintains that fiscal changes do not significantly affect aggregate output and employment even in the short run. As

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34. Fiscal policy may also at times act as a tool of "demand management," to manipulate the level of output in the economy by directly changing the total demand for goods and services. The level of investment may be affected because it responds to aggregate output. The effects are likely to be temporary, however.

35. The argument that fiscal policy has little effect on the aggregate level of output in an open economy with flexible exchange rates is associated with the theoretical work of Robert Mundell. See Robert A. Mundell, "The Appropriate Use of Monetary and Fiscal Policy for Internal and External Stability," *International Monetary Fund Staff Papers*, vol. 9 (1962), pp. 70-77.

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above, in the long run they do affect the composition of output, particularly the share of GNP devoted to investment.

Most economists agree, then, that in the long run large fiscal deficits depress the accumulation of wealth and thereby reduce living standards. The open-economy perspective suggests that a substantial part of the reduction in capital formation might come about through a reduction in U.S. net foreign investment. Though domestic investment might not suffer, the income from U.S.-owned capital, broadly defined, would be reduced. 36/

Interest Rates. While the ultimate concern about fiscal deficits is their effect on the capital stock and on living standards, much discussion has focused on whether deficits affect interest rates. The reason is that it is extremely difficult to isolate directly the various factors affecting the capital stock. Interest rates could be one important mechanism through which deficits affect capital formation--although not the only mechanism. According to the traditional view, which assumes a closed economy, an increase in the structural deficit reduces the amount of saving and raises real interest rates, thus "crowding out" investment. 37/ More recently, as capital markets have become more highly integrated internationally, more and more analysts are adopting the "open economy" model mentioned above, in which a substantial part of the effect on saving is offset by an inflow of capital from abroad. Because the U.S. economy is relatively large and accounts for a significant proportion of world saving, an increase in deficits could still have an effect on interest rates, but the effect might be smaller and more difficult to detect. Even if the effect of deficits on interest rates is muted by inflows of international capital, the result is not favorable to future U.S. living standards, since the country is accumulating obligations abroad that must be financed from future income. While it may be preferable to finance large deficits through capital inflows rather than financing them internally at higher interest rates, it would be even better if there were no deficit at all.

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36. The real exception to the generally held view about deficits and capital formation is the "neo-Ricardian" view associated with Robert Barro. According to his view, economic agents alter their private saving behavior to offset any lump-sum change in taxes. Many economists question the assumptions underlying the neo-Ricardian conclusions. Even the neo-Ricardians, however, concede that changes in government spending can affect interest rates.

37. Even in this case, a rise in interest rates need not imply that much crowding out of investment will take place. The degree of crowding out would also depend on the elasticity of saving with respect to changes in interest rates. If saving is quite elastic, more funds will become available and the amount of crowding out will be less than otherwise.

The last few years have seen much controversy over the effect of fiscal deficits on interest rates. Empirical work to resolve the issue has proved to be very difficult for a number of reasons. One is that, until the 1980s, U.S. deficits had not varied much, except during wartime. Another reason is that during recessions, fiscal deficits tend to rise and nominal interest rates--particularly short-term rates--tend to fall. These cyclical effects tend to confound or obscure any underlying relationship that may exist between structural deficits and real interest rates--an effect already weakened by the international capital flows described above.

Another reason that researchers have failed to reach a consensus may be that a number of studies have examined the relationship between deficits and interest rates rather than debt and interest rates. Many analysts believe that the stock of government debt relative to GNP, rather than the deficit per se, works most directly to affect the level of interest rates, and through them the level of private investment. In other words, the stock of debt relative to the size of the economy may be more important than the size of the deficit per se. 38/

A number of recent studies have attempted to test for a statistically significant relationship between interest rates and fiscal deficits or government debt. No consensus has been reached. Unfortunately, these studies tend to use different economic models, statistical techniques, and time periods. They also use different measures of deficits or debt. Some studies adjust for the effect of inflation on interest rates and the real value of the debt, while others do not. Some use a cyclically adjusted measure while others do not. 39/

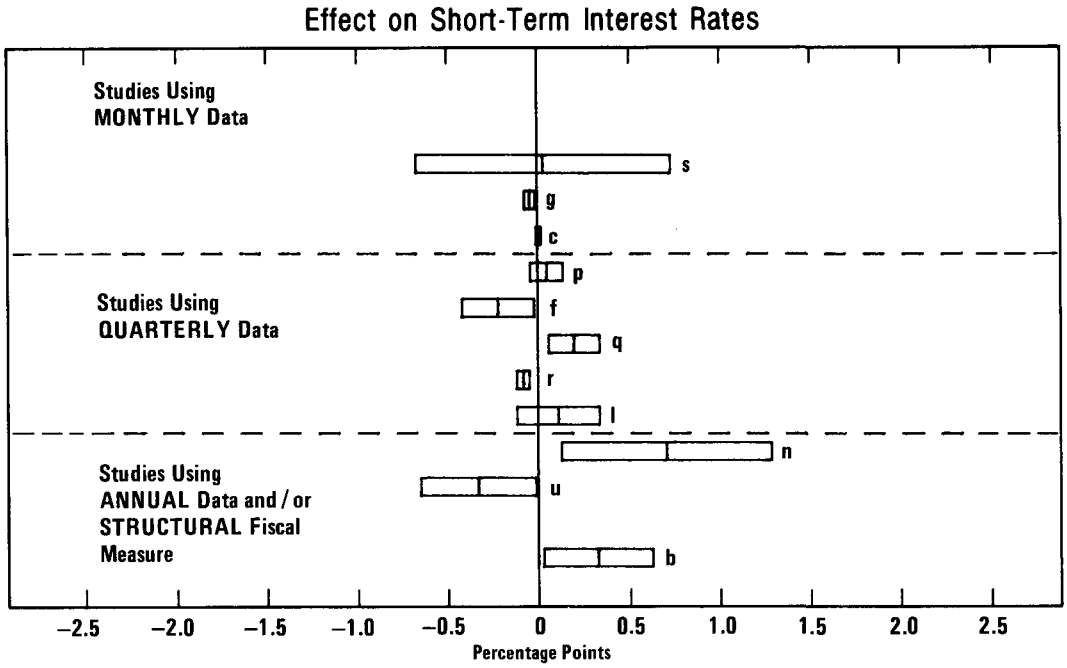
Despite these difficulties and limitations, CBO has summarized and compared the results of approximately 20 empirical studies of deficits and interest rates. Figure III-8 shows the estimated effect on rates from a $50 billion change in the deficit, calculated by using the results of various

38. This distinction could be especially relevant during times when the deficit and debt move in opposite directions. Under the CBO baseline, the deficit is projected to decline while the ratio of debt to GNP continues rising for a time. In the last few years of the projection, the debt-to-GNP ratio is also falling.

39. A few studies have explored more directly whether there is a link between fiscal deficits and a lower rate of capital formation. See John Makin, "The Effect of Government Deficits on Capital Formation," in Phillip Cagan, ed., *Essays in Contemporary Economic Problems* (Washington, D.C.: American Enterprise Institute, 1985), pp. 163-194; and Frank de Leeuw and Thomas M. Holloway, "The Measurement and Significance of the Cyclically Adjusted Federal Budget and Debt," *Journal of Money, Credit, and Banking*, vol. 17, no. 2 (May 1985), pp. 232-242.

Figure III-8.

Estimates of the Interest Rate Effects of a $50 Billion Increase in the Deficit



NOTE: The bars represent point estimates, plus and minus approximately 95 percent confidence intervals.

SOURCES: Congressional Budget Office and studies listed below.

a. James R. Barth and Michael D. Bradley, "Rational Expectations and the Effects of Federal Debt: Some Empirical Results," George Washington University, processed (1985).

b. James R. Barth, Frank S. Russek, and George Iden, "Government Debt, Government Spending, and Private Sector Behavior: Comment," *Southern Economic Journal* (October 1985).

c. Michael D. Bradley, "Federal Debt Surprises and Real Interest Rates: Whither Crowding Out?" George Washington University, Department of Economics, processed (October 1983).

d. Jack Carlson, Statement before the Joint Economic Committee (October 21, 1983).

e. Frank de Leeuw and Thomas M. Holloway, "The Measurement and Significance of the Cyclically Adjusted Federal Budget and Debt," *Journal of Money, Credit, and Banking*, vol. 17, no. 2 (May 1985), pp. 232-242.

f. William G. Dewald, "Federal Deficits and Real Interest Rates: Theory and Evidence," Federal Reserve Bank of Atlanta, *Economic Review* (January 1983), pp. 20-29.

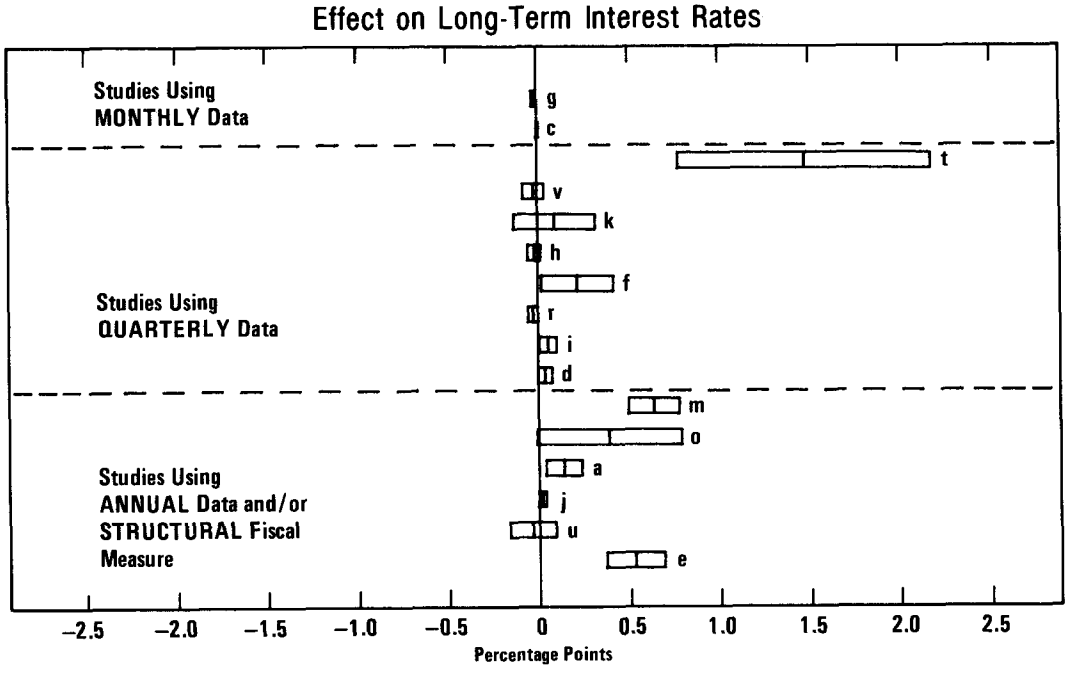
g. Paul Evans, "Do Large Deficits Produce High Interest Rates?" *American Economic Review*, vol. 75, no. 1 (March 1985), pp. 68-87.

h. Martin S. Feldstein and Gary Chamberlain, "Multimarket Expectations and the Rate of Interest," *Journal of Money, Credit, and Banking* (November 1973), pp. 973-902.

i. Martin S. Feldstein and Otto Eckstein, "The Fundamental Determinants of the Interest Rate," *Review of Economics and Statistics*, vol. 52, no. 4 (November 1970), pp. 363-375.

j. Jeffrey A. Frankel, "A Test of Portfolio Crowding-Out and Related Issues of Finance," National Bureau of Economic Research, Working Paper Series, No. 1205 (September 1983).

k. Demetrios S. Giannaro and Bharat R. Kolluri, "The Budget Deficit Debate: A Review of the Recent Empirical Studies," University of Hartford, processed (1985).



l. Gregory P. Hoelscher, "Federal Borrowing and Short Term Interest Rates," *Southern Economic Journal*, vol. 50 (October 1983), pp. 319-333.

m. Gregory P. Hoelscher, "New Evidence on Deficits and Interest Rates," *Journal of Money, Credit, and Banking*, vol. 18, no. 1 (February 1986), pp. 1-17.

n. Michael Hutchinson and David H. Pyle, "The Real Interest Rate/Budget Deficit Link: International Evidence, 1973-1982," Federal Reserve Bank of San Francisco, *Economic Review* (Fall 1984), pp. 26-35.

o. Lawrence Kudlow, Statement before the Senate Budget Committee, statistical appendix (October 20, 1981).

p. John H. Makin, "Real Interest, Money Surprises, Anticipated Inflation and Fiscal Deficits," *Review of Economics and Statistics*, vol. 65, no. 3 (August 1983), pp. 374-384.

q. John H. Makin and Vito Tanzi, "Level and Volatility of U.S. Interest Rates: Roles of Expected Inflation, Real Rates and Taxes," in Vito Tanzi, ed., *Taxation, Inflation, and Interest Rates* (Washington, D.C.: International Monetary Fund, 1984), pp. 110-142.

r. Angelo Mascaro and Allan H. Meltzer, "Long- and Short-Term Interest Rates in a Risky World," *Journal of Monetary Economics* (November 1983), pp. 485-518.

s. Brian Motley, "Real Interest Rates, Money and Government Deficits," *Economic Review*, Federal Reserve Bank of San Francisco (Summer 1983), pp. 31-45.

t. Patrice Muller and Robert Price, "Public Sector Indebtedess and Long-Term Interest Rates," paper presented for the World Bank/Brookings Institution Seminar on the International Consequences of Budgetary Deficits and the Monetary-Fiscal Policy Mix in the OECD (September 1984).

u. John A. Tatom, "A Perspective on the Federal Deficit Problem," Federal Reserve Bank of St. Louis, *Review*, vol. 66 (June/July 1984), pp. 5-17.

v. U.S. Treasury Department, *The Effects of Deficits on Prices of Financial Assets: Theory and Evidence* (Washington, D.C.: U.S. Government Printing Office, March 1984).

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single-equation studies. 40/ Most of the estimates in the table are on the right or positive side of the vertical axis, although common tests of statistical significance do not rule out the possibility that there is no effect. The fact that most of the point estimates are on the right side of the vertical axis, however, means that fairly strong positive effects cannot be ruled out either.

Several considerations have seemed to determine the conclusions of these studies. Studies that used annual data were more apt to find a statistically significant relationship than those that used quarterly or monthly data. Annualizing tends to smooth the data, perhaps making it easier to discern an underlying relationship. In addition, studies that attempted to adjust for the business cycle in measuring the deficit or debt tended to find more of a relationship than studies that did not make such adjustments. Finally, some of the studies reported finding a relationship with long-term but not short-term interest rates.

Given the complexity of the problem, it is not surprising that few empirical studies have uncovered a clear causal link between deficits and interest rates. Most of the studies that have been published to date--both those that find no relationship as well as those that do--have based their conclusions on tenuous evidence. One recent review of several such studies found that the results could be reversed by making minor changes in the specification of the statistical relationships tested or in the measures of budget deficits used. 41/ The bottom line is that, at the current time, few conclusions on this subject are reliable, and the overall inference seems to be that the data are inconclusive.

Saving and Investment Flows. While the link between deficits and interest rates is obscure, that between deficits and the accumulation of aggregate capital or wealth is clearer. Larger budget deficits must leave fewer resources available for domestic private investment unless there is a fully compensating increase in private domestic saving, in the surpluses of state and local governments, in the flow of foreign saving, or in all of these together (see Table III-2 and Figure III-9). How have the large budget deficits of the 1980s been financed? According to the national income accounts,

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40. For the equations that used government debt (rather than the deficit), the calculations are based on the effect of a $50 billion change in the deficit on the level of debt after one year. If a longer period had been assumed, the effect in some cases could be considerably larger.

41. See James Barth, George Iden, and Frank Russek, "Do Federal Deficits Really Matter?" *Contemporary Policy Issues*, vol. 3, no. 1 (Fall 1984-1985), pp. 79-95.

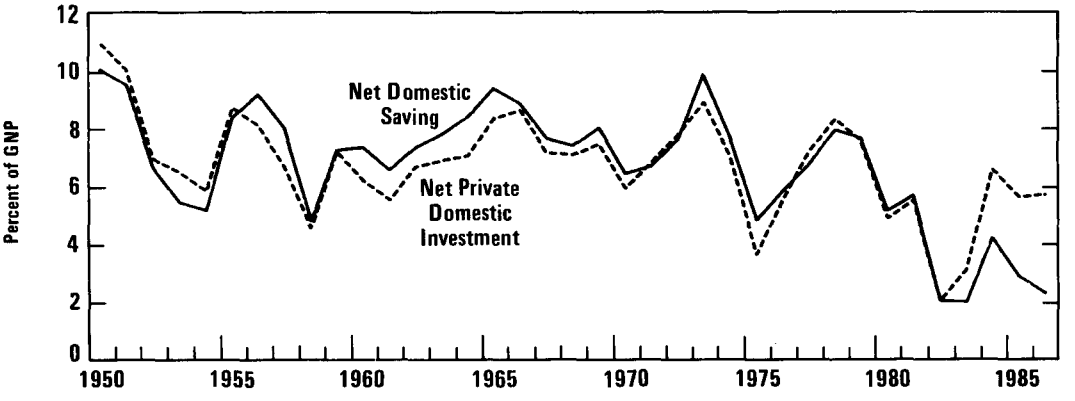
TABLE III-2. NET SAVING, ADDITIONS TO WEALTH, AND INVESTMENT FLOWS AS PERCENT OF GNP (NIPA basis)

Period	(1) Net Private Domestic Saving	(2) State and Local Surplus	(3) Federal Deficit	(4) Net Domestic Saving--Additions to Wealth (1)+(2)-(3)	(5) Net Domestic Saving Shortfalls (6)-(4) = Net Capital Inflow	(6) Net Private Domestic Investment
1950-1959	7.5	-0.2	-0.1	7.4	0.1	7.5
1960-1969	8.1	0.0	0.3	7.8	-0.8	7.1
1970-1979	8.1	0.8	1.7	7.2	-0.2	6.9
1980-1986 a/	6.2	1.3	4.1	3.4	1.4	4.8
1950-1986 a/	7.6	0.4	1.3	6.7	-0.0	6.7
Annual						
1980	6.4	1.0	2.2	5.2	-0.2	4.9
1981	6.6	1.1	2.1	5.6	-0.1	5.5
1982	5.5	1.1	4.6	2.0	0.0	2.0
1983	5.7	1.4	5.2	1.9	1.2	3.1
1984	6.9	1.8	4.5	4.2	2.4	6.6
1985	6.3	1.5	5.0	2.8	2.8	5.6
1986 a/	5.7	1.4	4.9	2.2	3.4	5.7

SOURCES: Congressional Budget Office; Department of Commerce, Bureau of Economic Analysis.

a. Estimate for 1986.

Figure III-9.
Net Saving and Investment



SOURCES: Congressional Budget Office; Department of Commerce, Bureau of Economic Analysis.

net private domestic investment in the 1980s has averaged somewhat less than in the earlier postwar period--by about two to three percentage points of GNP. While some of this reduction was no doubt associated with the 1982 recession, part of it may have been the result of large fiscal deficits. The big adjustment appears to have been in the flow of foreign saving. During the 1950 to 1979 period, U.S. investment abroad averaged approximately 0.3 percent of GNP. This rate was reversed in the 1980s by a net capital inflow averaging approximately 1.5 percent of GNP.

While such accounting data do not constitute a proof, they are at least consistent with the view that higher fiscal deficits may have contributed somewhat to lower domestic investment and perhaps substantially to lower levels of wealth accumulation. 42/ A depressing effect on investment would tend to reduce labor productivity and wage rates. To the extent that capital inflows prevented the effect on domestic investment, wage rates might not

42. The fact that private saving has not increased seems to contradict the neo-Ricardian view that changes in fiscal deficits tend to be offset by changes in private behavior. Proponents of that view, however, point out that the failure of private saving to increase may result in part from the vast increases in wealth associated with rising stock and bond prices. Without this surge in household wealth, perhaps the saving rate would have been significantly higher.

suffer. At the same time, the inflow of foreign capital would imply claims on future income.

Implications of Budget Deficits for Future Standards of Living

Whether or not deficits reduce domestic investment in the short run, most analysts agree that they reduce the accumulation of national wealth. This reduction may come about through slower investment in productivity-enhancing capital, slower accumulation of claims against other economies, or increases in the claims of other economies on the United States.

- If deficits significantly reduce the capital stock, then U.S. production and the incomes that it yields to both workers and owners of capital will be lower. As a result, the U.S. standard of living will eventually fall significantly below what it otherwise would be, though studies suggest that this may take some time--on the order of 20 years or so. 43/

- If deficits induce net inflows of capital from abroad, those may help to maintain the U.S. capital stock and the productivity of U.S. workers. But net U.S. wealth will be reduced, whether because of an increase in foreign claims on U.S. income or because of a reduction in claims by Americans on income produced abroad. In this case, also, the standard of living of U.S. residents will fall significantly below what it otherwise would be, though it may take even longer--on the order, perhaps, of 40 years--for the decrease to be felt.

Evidence that is consistent with the latter case comes from a comparison of the recent growth rates of gross national product (which measures the output of American-owned labor and capital) and gross domestic product (which measures U.S. output regardless of the nationality of the owner of the resources involved). Over the last three years, the growth rate of GDP has been higher than that of GNP by roughly two-tenths of a percentage point on average. The difference reflects the increasing share of income generated in the United States that is lost to Americans because of the deterioration in their net foreign asset position.

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43. A fall may be occurring now. The deterioration in the U.S. net foreign asset position during the past several years reflects the fact that U.S. residents have not been investing abroad as much as they did in the past.

The fact that changes in living standards take so long to be felt has led many to call the issue one of justice between generations. That is, the high deficits may allow people living today to enjoy higher consumption at the expense of those who will be living tomorrow.

IMPLICATIONS FOR THE FIVE-YEAR BUDGET PROJECTIONS

CBO's baseline estimates of the budget deficit through 1992 are based on highly uncertain projections of output, inflation, unemployment, and other key economic variables. If economic growth turns out to be weaker than what is now projected, the result will be higher budget deficits than projected. Achieving the targets of the Balanced Budget Act could then be more difficult.

The Outlook for Potential and Actual Growth

CBO projects that potential output as measured by gross domestic product (GDP) will grow at an average annual rate of 2.6 percent from 1986 through 1992. This rate implies a growth in potential GNP of about 2.5 percent. During the last two years of the projection period, actual and potential output are assumed to coincide. The path to potential output consists of two parts. Through 1988, real GDP grows by 3.1 percent, and real GNP by 3.0 percent. This forecast is consistent with the fiscal policy assumption that the Balanced Budget Act targets will be achieved. In 1988 through 1990, GDP is projected to grow at its average postwar rate of 3.2 percent, and GNP at 3.1 percent, thus gradually reducing the gap between actual and potential output.

The major assumptions underlying the projected growth of potential GNP through 1992 are that (at constant 6 percent unemployment) labor productivity (GNP per worker) rises at a rate of 1.3 percent, while the work force expands by 1.2 percent per year. As actual GNP moves toward potential GNP, the actual growth in productivity and in the work force are assumed to exceed their corresponding growth at potential, reflecting a projected decline in the unemployment rate to 6 percent. The assumptions used by CBO for projecting the growth rate of potential output, and the path actual output would take to reach potential, are subject to considerable uncertainty. Other combinations of assumptions are also quite plausible. Some would bring the economy more quickly to its potential path. Others would maintain a gap between actual and potential output throughout the projection period.

TABLE III-3. A COMPARISON OF AVERAGE GROWTH RATE PROJECTIONS FOR REAL GNP, EMPLOYMENT, AND PRODUCTIVITY (Average growth, 1986 to 1992)

	Real GNP	Civilian Employment	Real GNP/ Employment
CBO	2.8	1.5	1.3
Chase	2.7	1.6	1.1
DRI	2.8	1.6	1.2
Townsend-Greenspan	2.7	1.4	1.2
WEFA	2.8	1.5	1.3

SOURCES: Congressional Budget Office; Chase Econometrics; Data Resources, Inc.; Townsend-Greenspan & Co., Inc.; Wharton Econometric Forecasting Associates.

A rough range of uncertainty for the GNP projection through 1992 can be obtained by comparing this projection to the average annual growth rate projections made by other forecasters. Table III-3 presents four such projections of GNP growth, in addition to the CBO projection. It also shows the annual average growth rate projected for employment and productivity (GNP per worker) from 1986 to 1992. The average of the four projections is 2.7 percent for GNP, 1.5 percent for employment, and 1.2 percent for productivity--approximately the same rates projected by CBO.

Budget Consequences of Slower Economic Growth

The CBO five-year budget projections assume that real GNP grows at an average annual rate of 2.8 percent from 1986 to 1992. This assumption does not appear overly optimistic or pessimistic in light of other forecasts. Since slower growth is possible, however, it is important to evaluate the consequences it would have for the CBO five-year budget projections.

TABLE III-4. BUDGET EFFECTS OF ONE-HALF PERCENTAGE POINT LESS IN REAL GNP GROWTH THAN PROJECTED (By fiscal years, in billions of dollars)

	1987	1988	1989	1990	1991	1992
Revenues	-2	-7	-14	-21	-31	-41
Outlays	a/	1	3	5	8	11
Deficit	3	8	16	26	38	52

SOURCE: Congressional Budget Office.

a. Less than $500 million.

How much would the five-year deficit projections be altered by assuming one-half percentage point less growth, but the same path for inflation? Rule-of-thumb calculations suggest that the result would be to add roughly $52 billion to the deficit by 1992 (see Table III-4). 44/ Less growth would lower revenues primarily by reducing total taxable incomes, although it would also entail differences in the mix of income shares and tax bases. The increase in outlays would result mainly from increased payments for income maintenance programs and higher debt service costs. 45/

44. The above calculations assume that growth in real output will be a constant one-half percentage point less beginning in 1987 and that there will be an accompanying 0.2 percent increase in the unemployment rate each year. If slower growth was the result of less growth in productivity, then the effect on the deficit would be somewhat less, because the unemployment rate, and thus transfer payments, would not be increased.

45. See Chapter II for a detailed discussion of the sensitivity of the budget to economic conditions.

APPENDIXES

APPENDIX A

CBO BASELINE CONCEPTS AND ASSUMPTIONS

The CBO budget baseline shows the pattern federal government revenues and spending would take during the next five years if current policies were continued without change. The Congressional Budget Office makes these projections so that the Congress can assess future budget conditions and measure the budgetary effects of proposed revenue or spending legislation.

This appendix describes the assumptions used in preparing the baseline revenue, spending, and credit projections for this report. The first section describes the revenue baseline. The next two sections explain the baseline projections of budget authority and outlays. The final section discusses the credit projections.

BASELINE REVENUES

Baseline revenues are, with two exceptions, revenues generated under existing tax law. In these cases, excise taxes dedicated to trust funds are assumed to be continued beyond their scheduled expiration:

- Airport and Airway Trust Fund taxes are assumed to be extended at current rates beyond December 31, 1987.
- Highway Trust Fund taxes are assumed to be continued at current rates beyond September 30, 1988.

All other tax provisions scheduled to expire between 1987 and 1992 are assumed to do so as specified in law. Among the expiring provisions are the excise tax on telephone services, which is scheduled to expire after December 31, 1987, and the newly enacted customs user fees on certain merchandise imports, which are scheduled to expire after September 30, 1989.

OVERVIEW OF BASELINE SPENDING CONCEPTS

Federal spending can be divided into two categories. A large part of federal spending is mandated by existing law and is referred to as direct